## REMARKS

This Amendment responds to the Office Action mailed on August 23, 2005, and the references cited therewith.

Claim 1 is amended. Claims 1-3, 14, 15, 19 and 28-32 are now pending in this application.

The Examiner is thanked for the courtesy of an interview and for his comments regarding Okada.

Support for the amendment of claim 1 is found in the specification at Example 1, page 17, line 25- page 18, line 11.

### *§102 Rejection of the Claims*

The PTO has rejected claims 1-3, 14-15, 19 and 28-32 under 35 U.S.C. § 102(b) as being anticipated by Yamamoto et al. (hereinafter Yamamoto). Applicant submits that his amendment of claim 1 overcomes this rejection.

Applicant believes there is a misunderstanding about the stages of solidification described by Yamamoto and also a misunderstanding about the solidification process according to Applicant's invention. Once these misunderstandings are clarified, Applicant believes the differences between Yamamoto and his invention will be apparent.

Yamamoto first combines a drug and water solution with a polymer and solvent solution to form a water in oil emulsion. The aqueous solution is the inner, discontinuous phase while the polymer solution is the continuous phase. According to this characterization, the aqueous solution consists of micelles suspended in the continuous polymer solution. In other words, the physical structure of the aqueous solution consists of microdroplets dispersed in the polymer solution.

The first misunderstanding occurs at this point. While the aqueous microdroplets are liquid, their interfaces with the polymer solution are solid. The surface contact between those aqueous microdroplets and the solution of polymer causes polymer to coagulate at the surface of the microdroplets and form solid shells around the microdroplets. To accomplish a discrete interphase boundary and produce the polymer solidification, the organic solvent used for the

polymer solution must have negligible water solubility. Yamamoto recognizes this requirement by stating that:

> "Said organic solvent may be any organic solvent which has a boiling point not higher than about 120°C and hardly miscible with water. Examples are halogenated alkanes (e.g. dichloromethane, chloroform, chloroethane, trichloroethane, carbon tetrachloride), ethyl acetate, cyclohexane, benzene and toluene.
>
> Yamamoto at col. 5, lines 54-59.

While Yamamoto lists a number of solvents for this use, his examples demonstrate that only those solvents with negligible or no water solubility are applicable. Each of his five examples uses methylene chloride or chloroform as the organic solvent for the polymer. Yamamoto's use of a water insoluble solvent is also reflected by all but one of the solvents of his list given above. Chloroform, chloroethane, trichloroethane, carbon tetrachloride, cyclohexane, benzene and toluene all exhibit the same complete water insolubility as methylene chloride (dichloromethane). Only ethyl acetate is aberrant with a water solubility of about 8.3% according to the *Handbook of Chemistry and Physics* (copy enclosed). Yamamoto's other solvents have water solubilities of 1% (chloroform) 0.5% (chloroethane), insoluble (trichloroethane), insoluble (carbon tetrachloride), insoluble (cyclohexane), 0.08% (benzene) and 0.05% (toluene) according to the *Handbook of Chemistry and Physics.* It is notable in this respect that Yamamoto does not use ethyl acetate in any of his examples. The other examples of Yamamoto's solvents demonstrate Yamamoto's meaning of his general solvent description. "hardly miscible." Ethyl acetate is not 'hardly miscible according to this description or standard.

It follows that Yamamoto's first W/O emulsion does not allow any of the organic solvent/polymer solution to infuse into the water microdroplets. Instead, the sharp interface between the organic phase and the water phase causes formation of solid polymer shells around the water microdroplets. The lack of infusion between the water and the organic solvent means that the water microdroplets remain discrete and the bulk of the polymer in the organic solvent does not contact a polar, protic medium that would cause it to precipitate. In other words, the polymer of the organic solvent phase will not coagulate.

In contrast, the water solubilities of the organic solvent of claim 1 of the present invention range between 2% and 20%. This solubility permits some of the organic solvent/polymer solution to infuse into the water phase. This infusion means that no discrete boundaries exist between the water and organic solvent phases. It also means that the water phase does not solely exist as discrete microdroplets. Instead, there is a recombination such that some water is present in the organic solvent phase and some organic solvent/polymer is present in the water phase. The result is a tendency of the entire mixture to solidify. Because of the choice of the low water solubility of the organic solvent, however, the solidification does not happen immediately.

As indicated at page 4, lines 16-24 of the present specification, the formulation of the invention is useful for a moderate period of time ranging from 7 days down to a few hours. The usefulness is terminated when the formulation solidifies. Example 2 of the present application demonstrates what happens as water completely infuses with organic solvent. In this example, a high water solubility solvent, N-methyl pyrrolidone, is used and solidification occurs rapidly. This example also demonstrates how the formulation with a low water solubility solvent will eventually solidify.

The second misunderstanding is a result of failure to address the water to organic solvent ratios. Yamamoto teaches a very low water to organic solvent ratio. All of his examples demonstrate very low water to organic solvent ratios. These ratios are as follows: 0.075:1 (Example 1, 0.3 ml water to 4 ml solvent), 0.1:1 (Example 2, 0.5 ml water to 4.5 ml solvent), 0.04:1 (Example 3, 0.25 ml water to 6.3 ml solvent), 0.13:1 (Example 4, 1 ml water to 7.5 ml solvent) and 0.09:1 (Example 5, 0.5 ml water and 5.5 ml solvent). These low ratios ranging from 0.04:1 to 0.13:1 mean that an insignificant amount of water is present so that coagulation of the polymer in the organic phase will not occur as would happen if the organic phase were flooded with water.

In contrast, the present invention, as recited by amended claim 1, employs a higher ratio of water to organic solvent such that the polymer in the organic solvent will eventually precipitate. However, the ratio is controlled so that the system is not flooded with water to cause immediate precipitation. The result is that the formulation of the present invention eventually will produce polymer precipitation without additional water but also avoids immediate

precipitation. Nevertheless, the water present is sufficient to protect the biological agent from significant drug-polymer interaction while both are dissolved in liquids.

The third misunderstanding involves the product produced. Yamamoto combines his W/O emulsion with a third water phase. This phase causes the polymer/solvent phase to completely coagulate. However, Yamamoto does not obtain a single body solid. Instead, he obtains microcapsules of polymer shells containing water and drug. While the third water phase causes precipitation of the polymer because that third phase is the continuous phase, microcapsules filled with the aqueous solution of drug cannot be produced by Yamamoto's process unless those water microdroplets already had solid polymer shells surrounding them. If the first W/O emulsion were only a liquid/liquid emulsion with no solid shells, Yamamoto's last step to form the microcapsules in the W/O/W emulsion would merely dissolve the drug in the continuous water phase and make polymer particles with no drug. The first emulsion would consist of liquid water droplets emulsified in the solvent/polymer continuous phase. If this kind of emulsion were combined with a third water phase that becomes the continuous phase under the emulsification conditions required by Yamamoto, those water microdroplets will combine with that continuous water phase such that the drug will be outside of the polymer particles. The emulsification effected by Yamamoto's high speed stirring would cause the recombination of the water microdroplets with the continuous third water phase if those microdroplets were not already isolated by polymer shells.

The present invention differs significantly from Yamamoto in this respect also. Although there is significant mixing and emulsification of the water and organic solvent portions according to the present invention, no solid polymer shells result. Instead, the mixture is a liquid-liquid emulsion. When it is contacted with water or body fluid (but is not re-emulsified), this entire mixture converts to a single body solid. If solid polymer shells were present in this mixture as Yamamoto requires, no single body solid would result.

In summary, Yamamoto's disclosed composition significantly differs from the claimed composition. Yamamoto does not employ a solvent having the requisite water solubility. Yamamoto does not employ the ratio of water phase to organic phase recited by the present claims. Yamamoto does not have a liquid – liquid emulsion configuration for his first W/O

emulsion as the present invention presents. Instead, Yamamoto has solid polymer shells as microcapsules dispersed in his continuous organic phase.

For these reasons, Applicant submits that his claims are not anticipated by Yamamoto. Applicant respectfully requests withdrawal of this rejection over Yamamoto.

*§112 Rejection of the Claims*

The PTO has rejected claim 28 under 35 U.S.C. § 112, second paragraph, as being indefinite. The term "non-polymeric material" is cited as being unclear.

Applicant responds that the term "non-polymeric material" is a defined and exemplified term. Applicant refers to page 10, line 22 through page 11, line 15. This passage describes non-polymeric material and provides many examples. Applicant submits that this explanation makes this term clear. Applicant also refers to §608.01(o) in support of the specification basis for definition of this term in his claims. Applicant respectfully requests withdrawal of this rejection.

The PTO has also rejected claims 1-15, 19 and 28-32 under 35 U.S.C. § 112, first paragraph, for enablement regarding polymer viscosity.

Applicant responds that viscosity is not a limitation of the invention. Apparently, the PTO has focused upon viscosity because Yamamoto indicates viscosity is important for his invention. Yamamoto desires to produce microcapsules of a certain size. To accomplish this production, Yamamoto must have a certain viscosity of his W/O and W/O/W emulsions. Otherwise, he will not be able to shear the phases to a degree to finely divide the discontinuous phase to the size desired.

Applicant, however, does not produce microparticles, microdroplets, microcapsules or any other particular size of micelles of a discontinuous phase of an emulsion. Applicant instead produces a single body solid formed from the entire bolus of continuous phase. Applicant explains at page 9, line 25 through page 10, line 2 that the viscosity of the delivery composition can vary from easily flowable (i.e., a low viscosity) to a very high viscosity. Since the viscosity of the delivery composition is governed by the viscosity of the polymer, the intrinsic or inherent viscosity of the polymer may equally vary. In other words, the viscosity of the polymer may vary from very low to very high. There is no parameter or requirement of the composition that generates a need for a specific range of viscosity as Yamamoto requires.

For this reason, Applicant respectfully requests withdrawal of this rejection.

## CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at 612-373-6900 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Name Signature

# HANDBOOK
OF
# CHEMISTRY AND PHYSICS

A READY-REFERENCE BOOK OF
CHEMICAL AND PHYSICAL DATA
FORTY-SECOND EDITION

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IN COLLABORATION WITH A LARGE NUMBER OF PROFESSIONAL CHEMISTS AND PHYSICISTS WHOSE ASSISTANCE IS ACKNOWLEDGED IN THE LIST OF GENERAL COLLABORATORS AND IN CONNECTION WITH THE PARTICULAR TABLES OR SECTIONS INVOLVED.

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| No. | Name | Synonyms | Formula | Mol. Wt. |
|---|---|---|---|---|
| 1090 | **Benzamide, *o*, *m* or *p*-** | **methyl-.** *See Toluamide.* | | |
| 1091 | **——, *o*-nitro-** | | $NO_2C_6H_4CONH_2$ | 166.13 |
| 1092 | **——, *m*-nitro-** | | $NO_2C_6H_4CONH_2$ | 166.13 |
| 1093 | **——, *p*-nitro-** | | $NO_2C_6H_4CONH_2$ | 166.13 |
| 1094 | **——, *N*-phenyl-.** | See *Benzanilide.* | | |
| 1095 | **Benzamidine** | benzenecarbonamidine*; benzenylamidine | $C_6H_5C(:NH)NH_2$ | 120.15 |
| 1096 | **——, *N*-1-naphthyl-** | benzenylnaphthylamidine | $C_6H_5C(:NH)$-$NHC_{10}H_7$ | 246.30 |
| 1097 | **Benzamidoxime.** | See *Benzamide, oxime.* | | |
| 1098 | **Benzamine.** | See *β-Eucaine.* | | |
| 1099 | **Benzanalgen.** | See *Analgen.* | | |
| 1100 | **Benzanilide** | *N*-phenylbenzamide; *N*-benzoylaniline | $C_6H_5CONHC_6H_5$ | 197.23 |
| 1100M | **——, *p*-amino-** | | $p$-$H_2NC_6H_4$-$CONHC_6H_5$ | 212.24 |
| 1101 | **——, *o*-nitro-** | | $NO_2C_6H_4$-$CONHC_6H_5$ | 242.23 |
| 1102 | **——, *o'*-nitro-** | | $C_6H_5CONHC_6H_4$-$NO_2$ | 242.23 |
| 1103 | **——, *m*-nitro-** | | $NO_2C_6H_4$-$CONHC_6H_5$ | 242.23 |
| 1104 | **——, *m'*-nitro-** | | $C_6H_5CONHC_6H_4$-$NO_2$ | 242.23 |
| 1105 | **——, *p*-nitro-** | | $NO_2C_6H_4CONHC_6H_5$ | 242.23 |
| 1106 | **——, *p'*-nitro-** | | $C_6H_5CONHC_6H_4$-$NO_2$ | 242.23 |
| 1107 | **——, thio-** | | $C_6H_5CSNHC_6H_5$ | 213.29 |
| 1108 | **——, 3,4,5-trihydroxy-.** | See *Gallanilide.* | | |
| 1109 | **Benzaurin** | *p,p'*-dihydroxytriphenylcarbinol | $C_6H_5(C_6H_4OH)_2COH$ or $C_6H_5(OHC_6H_4)$-$C{:}C_6H_4{:}O$ | 292.32 (274.30) |
| 1110 | **Benzazide.** | See *Benzoyl azide.* | | |
| 1111 | **1-Benzazine.** | See *Quinoline.* | | |
| 1112 | **2-Benzazine.** | See *Isoquinoline.* | | |
| 1113 | **Benzene*** | benzol; benzole; phene* | $C_6H_6$ | 78.11 |
| 1114 | **——, hexabromide.** | See *Cyclohexane, 1,2,3,4,5,6-hexabromo-*.* | | |
| 1115 | **——, hexachloride.** | See *Cyclohexane, 1,2,3,4,5,6-hexachloro-*.* | | |
| 1116 | **——, acetyl-.** | See *Acetophenone.* | | |
| 1117 | **——, acetylenyl-.** | See *Benzene, ethynyl-.* | | |
| 1118 | **——, 1-allyl-3,4-methylenedioxy-.** | See *Safrole.* | | |
| 1119 | **——, amino-.** | See *Aniline.* | | |
| 1120 | **——, aminodimethylamino-.** | See *Phenylenediamine, N, N-dimethyl-.* | | |
| 1121 | **——, amoxy-.** | See *Ether, amyl phenyl.* | | |
| 1122 | **——, amyl-** | 1-phenylpentane | $C_6H_5(CH_2)_4CH_3$ | 148.24 |
| 1123 | **——, sec-*n*-amyl-.** | See *Benzene, (α-methylbutyl)-.* | | |
| 1124 | **——, *tert*-amyl-** | 2-methyl-2-phenylbutane | $C_6H_5C(CH_3)_2C_2H_5$ | 148.24 |
| 1125 | **——, 1-amyl-2,4-dihydroxy-.** | See *Resorcinol, 4-amyl-.* | | |
| 1126 | **——, anilino-.** | See *Diphenylamine**. | | |
| 1127 | **——, azimino-.** | See *1,2,3-Benzotriazole.* | | |

*Name approved by the International Union of Chemistry.



| No. | Crystalline form, color and index of refraction | Density g/ml | Melting point, °C | Boiling point, °C | Solubility in grams per 100 ml of | | |
|---|---|---|---|---|---|---|---|
| | | | | | Water | Alcohol | Ether, etc. |
| 1090 | | | | | | | |
| 1091 | need. f. dil. al. | $1.402^{\frac{22}{4}}$ | 176.6 | 317 | s. h. | s. | s. eth. |
| 1092 | yel. monocl. need. f. w. | ..... | 142.7 | 315 | s. h. | s. | s. eth. |
| 1093 | need. f. w. | ..... | 201.4 | ..... | v. sl. s. | s. | s. eth. |
| 1094 | | | | | | | |
| 1095 | col. cr. | ..... | 80 | d. | s. | v. s. | sl. s. eth. |
| 1096 | pl. f. al. | ..... | 141 | ..... | i. | s. | s. eth. |
| 1097 | | | | | | | |
| 1098 | | | | | | | |
| 1099 | | | | | | | |
| 1100 | col. leaf. f. al. | $1.321^{\frac{4}{4}}$ | 161 | $117–9^{10}$ | v. sl. s. | $3.16^{30}$ | sl. s. eth. |
| 1100M | col. cr. | ..... | 135–6 | ..... | ..... | s. | ..... |
| 1101 | wh. need. f. al. | ..... | 155 | ..... | v. sl. s. | v. s. | sl. s. eth. |
| 1102 | yel. need. f. al. | ..... | 94–8 | ..... | sl. s. h. | s. | v. s. eth. |
| 1103 | leaf. f. w. or al. | ..... | 153–4 | subl. | v. sl. s. c. | s. | s. eth., bz. |
| 1104 | leaf. f. amyl al. | ..... | 157 | ..... | i. | sl. s. | v. s. chl. |
| 1105 | leaf. f. eth. | ..... | 210–11 | ..... | v. sl. s. | s. | s. eth. |
| 1106 | yel. need. | ..... | 199 | ..... | i. | sl. s. h. | ..... |
| 1107 | yel. pr. f. al. | ..... | 100–2 | d. | i. | s. | v. s. eth. |
| 1108 | | | | | | | |
| 1109 | brick red powd. | ..... | 100 | ..... | v. sl. s. | s. | s. eth.; sl. s. h. bz. |
| 1110 | | | | | | | |
| 1111 | | | | | | | |
| 1112 | | | | | | | |
| 1113 | col. rhomb. pr. or inflam. liq.; $1.50112^{20}$ | $0.87901^{20}$ | 5.51; 5.48–.49 | 80.099 | $0.082^{23}$ | ∞ | ∞ eth., ac. a., acet., tol.; s. chl. |
| 1114 | | | | | | | |
| 1115 | | | | | | | |
| 1116 | | | | | | | |
| 1117 | | | | | | | |
| 1118 | | | | | | | |
| 1119 | | | | | | | |
| 1120 | | | | | | | |
| 1121 | | | | | | | |
| 1122 | col. liq., $1.4751^{15}$ | $0.860^{\frac{22}{4}}$ | −78.25 | 202.1 | i. | s. | ∞ eth. |
| 1123 | | | | | | | |
| 1124 | liq., $1.49154^{23}$ | $0.8736^{15}$ | ..... | 189–91 | i. | ∞ | ∞ eth. |
| 1125 | | | | | | | |
| 1126 | | | | | | | |
| 1127 | | | | | | | |

For explanations and abbreviations see beginning of table.

| No. | Name | Synonyms | Formula | Mol. Wt. |
|---|---|---|---|---|
| 69 | **Acetanilide, o-hydroxy-*N*-methyl-** | *o*-(acetylmethylamino)-phenol | $CH_3CON(CH_3)C_6H_4OH$ | 165.19 |
| 70 | ——, *p*-hydroxy-*N*-methyl- | | $CH_3CON(CH_3)C_6H_4OH$ | 165.19 |
| 71 | ——, *p*-iodo- | | $CH_3CONHC_6H_4I$ | 261.07 |
| 72 | ——, *p*-methoxy- | See *p-Acetanisidide*. | | |
| 73 | ——, *N*-methyl- | exalgin | $CH_3CON(CH_3)C_6H_5$ | 149.19 |
| 74 | ——, *o*-methyl- | See *o-Acetotoluide*. | | |
| 75 | ——, *N*-methyl-*p*-nitro- | | $CH_3CON(CH_3)C_6H_4NO_2$ | 194.19 |
| 76 | ——, *o*-nitro- | | $CH_3CONHC_6H_4NO_2$ | 180.16 |
| 77 | ——, *m*-nitro- | | $CH_3CONHC_6H_4NO_2$ | 180.16 |
| 78 | ——, *p*-nitro- | | $CH_3CONHC_6H_4NO_2$ | 180.16 |
| 80 | ——, *N*-phenyl- | See *Acetamide, N, N-diphenyl-*. | | |
| 81 | ——, α-phenyl- | See *α-Toluanilide*. | | |
| 82 | ——, *p*-phenylazo- | See *Azobenzene, p-acetamido-*. | | |
| 83 | ——, thio- | | $CH_3CSNHC_6H_5$ | 151.22 |
| 84 | **o-Acetaniside** | *N*-acetyl-*o*-anisidine; *o*-acetanisidide | $CH_3CONHC_6H_4OCH_3$ | 165.19 |
| 85 | ***p*-Acetaniside** | *p*-methoxyacetanilide; *p*-acetamidoanisole; *N*-acetyl-*p*-anisidine; methacetin; *p*-acetanisidide | $CH_3CONHC_6H_4OCH_3$ | 165.19 |
| 86 | **Acetic acid** | ethanoic acid* | $CH_3COOH$ | 60.05 |
| 87 | ——, esters. | For esters other than those listed below see also "acetate" | | |
| 88 | ——, allyl ester | allyl acetate, 2-propenyl ethanoate* | $CH_3COOCH_2CH{:}CH_2$ | 100.11 |
| 89 | ——, amyl ester | amyl acetate; 1-pentanol acetate; amyl acetic ester | $CH_3COO(CH_2)_4CH_3$ | 130.18 |
| 90 | ——, benzyl ester | benzyl acetate; benzyl ethanoate* | $CH_3COOCH_2C_6H_5$ | 150.17 |
| 91 | ——, butyl ester | butyl acetate; butyl ethanoate* | $CH_3COO(CH_2)_3CH_3$ | 116.16 |
| 92 | ——, *sec*-butyl ester | 2-butanol acetate; α-methylpropyl ethanoate* | $CH_3COOCH(CH_3)C_2H_5$ | 116.16 |
| 93 | ——, cetyl ester | cetyl acetate; hexadecylethanoate*; *n*-hexadecylacetate | $CH_3COO(CH_2)_{15}CH_3$ | 284.47 |
| 94 | ——, ethyl ester | ethyl ethanoate*; acetic ester | $CH_3COOC_2H_5$ | 88.10 |
| 95 | ——, ethylene ester. | See *Glycol, diacetate*. | | |
| 96 | ——, furfuryl ester. | See *Furfuryl alcohol, acetate*. | | |
| 97 | ——, heptyl ester | *n*-heptyl acetate | $CH_3COOC_7H_{15}$ | 158.24 |
| 98 | ——, hexyl ester | *n*-hexyl acetate | $CH_3COO(CH_2)_5CH_3$ | 144.21 |
| 99 | ——, isoamyl ester | isoamyl acetate; 3-methyl-1-butanol acetate; γ-methylbutyl ethanoate* | $CH_3COO(CH_2)_2CH(CH_3)_2$ | 130.18 |
| 100 | ——, isobutyl ester | isobutyl acetate; β-methylpropyl ethanoate* | $CH_3COOCH_2CH(CH_3)_2$ | 116.16 |

* Name approved by the International Union of Chemistry.





| No. | Crystalline form, color and index of refraction | Density g/ml | Melting point, °C | Boiling point, °C | Solubility in grams per 100 ml of: Water | Alcohol | Ether, etc. |
|---|---|---|---|---|---|---|---|
| 69 | need. | | 150 | | sl. s. | v. s. | s. eth. |
| 70 | cr. | | 240 | | v. sl. s. | v. s. | s. eth. |
| 71 | monocl. | $1.989^{16-20}_{4}$ | 183–4 | | s. h. | $5.05^{21}$ | i. eth.; v. s. ac. a. |
| 72 | | | | | | | |
| 73 | col. rhomb. pr. f. al. 1.560, 1.576, 1.647 | $0.977^{120}_{4}$ | 101–4 (97–99) | 254.7 ($253^{712}$) | i. (sl. s.) | s. | |
| 74 | | | | | | | |
| 75 | leaf. f. w. | | 152–3 | | | s. | s. eth. |
| 76 | yel. monocl. leaf. | $1.419^{15}_{4}$ | 93 (90–1) | | s. h. | s. | v. s. eth., KOH |
| 77 | col.-yel. leaf. | | 155 (150.5) | | s. h. | s. | i. eth.; s. chl., KOH |
| 78 | yel. rhomb. pr. | | 215 | | v. sl. s. | s. | s. eth., KOH |
| 80 | | | | | | | |
| 81 | | | | | | | |
| 82 | | | | | | | |
| 83 | need. f. w. | | 75 | d. | i. | | i. eth.; s. alk., NaOH |
| 84 | pearly, wh. cr. f. w. | | 87–8 (84) | 303–5 | v. s. h. | $55.3^{21}$ | s. eth.; v. s. ac. a. |
| 85 | wh. powd., pr. or pl. f. w. | | 137–38 | | $0.2^{15}$ $8.3^{100}$ | $12.7^{21}$ | sl. s. eth.; s. chl., acet. |
| 86 | col. liq., 1.37182 | $1.049^{20}_{4}$ | 16.6 | 118.1 | ∞ | ∞ | ∞ eth.; i. $CS_2$ |
| 87 | under *o-Cresol*, *Cyclohexanol*, *etc.* | | | | | | |
| 88 | col. liq., 1.40448 | 0.928 | | 103–4 | sl. s. | ∞ | ∞ eth. |
| 89 | col. liq., 1.4012 | $0.879^{20}_{20}$ | | $148^{737}$ (145–7) | $0.18^{20}$ | ∞ | ∞ eth. |
| 90 | col. liq., 1.5232 | $1.057^{16}_{4}$ | −51.5 | $213.5^{755}$ | v. sl. s. | ∞ | ∞ eth. |
| 91 | col. inflam. liq., 1.3951 | $0.882^{20}_{4}$ $0.9016^{0}_{0}$ | −76.8 | 126.5 (124–6) | $0.5^{25}$ | ∞ | ∞ eth. |
| 92 | col. liq., $1.3866^{25}$ | $0.8648^{25}_{4}$ | | 112–3 | i. | s. | s. eth. |
| 93 | need., $1.4358^{32.9}$ | $0.858^{20}_{4}$ | 18.5 (16–9) | 200.5[15] | i. | v. sl. s. | v. s. eth. |
| 94 | col. inflam. liq., $1.37216^{18.9}$ | $0.901^{20}_{4}$; $0.90657^{15}_{4}$ | −83.6 | 77.15 | $8.6^{20}$ $7.4^{25}$ | ∞ | ∞ eth., chl., oils |
| 95 | | | | | | | |
| 96 | | | | | | | |
| 97 | col. liq., 1.4153 | $0.874^{16}_{16}$ | | 191.5 | i. | s. | s. eth. |
| 98 | col. liq. | $0.8902^{0}_{0}$ | | 169.2 | i. | v. s. | v. s. eth. |
| 99 | col. liq., $1.40170^{17.9}$ | $0.8699^{25}_{4}$ | −78.5 | 142.5 (138–40) | $0.16^{25}$ | ∞ | ∞ eth.; s. amyl al. |
| 100 | col. liq., $1.39114^{17.6}$ | 0.8712 | −98.9 | 116.5 (115–7) | $0.63^{25}$ | ∞ | ∞ eth. |

For explanations and abbreviations see beginning of table.

| No. | Name | Synonyms | Formula | Mol. Wt. | Crystalline form, color and index of refraction | Density g/ml | Melting point, °C | Boiling point, °C | Solubility in grams per 100 ml of Water | Alcohol | Ether, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2986 | **1,3-Cyclohexadiene-1,4-dicarboxylic acid*** | 2,3-dihydroterephthalic acid | $C_6H_4(COOH)_2$ | 168.14 | flocks | | | | i. c., s. h. | | |
| 2987 | **1,4-Cyclohexadienedione*.** See *Quinone.* | | | | | | | | | | |
| 2988 | **Cyclohexane*** | hexahydrobenzene; hexamethylene | $C_6H_{12}$ | 84.16 | col. liq., $1.42900^{15}$ | $0.7791\frac{20}{4}$ | 6.5 | 81.4 | i. | ∞ | ∞ eth. |
| 2989 | **——, amino-.** See *Cyclohexylamine*.* | | | | | | | | | | |
| 2990 | **——, bromo-*** | cyclohexyl bromide | $C_6H_{11}Br$ | 163.07 | col. liq., $1.49564^{15}$ | $1.3290\frac{15}{15}$ | | 163–5 | i. | ∞ | ∞ eth. |
| 2991 | **——, chloro-*** | cyclohexyl chloride | $C_6H_{11}Cl$ | 118.61 | col. liq., 1.46264 | $1.0161\frac{0}{0}$; $1.000\frac{20}{4}$ | −43.9 | 142.5 | i. | ∞ | ∞ eth., bz. |
| 2992 | **——, 1,3-dimethyl-** | hexahydro-*m*-xylene | $C_6H_{10}(CH_3)_2$ | 112.21 | col. liq. (*cis*) 1.4269 | $0.7735\frac{20}{4}$ | −85 | 121 | i. | ∞ | ∞ eth. |
| | | | | | (*trans*) 1.4254 | $0.772\frac{20}{4}$ | | $119^{756}$ | | | |
| 2993 | **——, 1,4-dimethyl-** | hexahydro-*p*-xylene | $C_6H_{10}(CH_3)_2$ | 112.21 | col. liq., 1.421 | (*cis*) $0.7671\frac{20}{4}$; (*trans*) $0.7638\frac{20}{4}$ | −86 | $120.5^{755}$ | | | |
| 2994 | **——, 1,2,3,4,5,6-hexabromo-** (α or *trans*) | benzene *trans*-hexabromide | $C_6H_6Br_6$ | 557.60 | col. monocl. pr. | | 212 | 119 | i. | sl. s. | sl. s. eth.; s. $CHCl_3$ |
| 2995 | **——, ——,** (β or *cis*) | benzene β-hexabromide | $C_6H_6Br_6$ | 557.60 | cub. cr. f. bz. | | 253 d. | | | i. | i. eth.; sl. s. bz. |
| 2996 | **——, 1,2,3,4,5,6-hexachloro-** (α or *trans*) | benzene *trans*-hexachloride | $C_6H_6Cl_6$ | 290.85 | col. monocl. pr. | $1.87\frac{20}{4}$ | 157 | 288 d. | i. | s. h. | $4.35^{15}$ chl.; $6.5^{15}$ bz.; v. s. aniline |
| 2997 | **——, ——,** (β or *cis*) | benzene *cis*-hexachloride | $C_6H_6Cl_6$ | 290.85 | col. cr | $1.89\frac{19}{4}$ | 297 | subl. | i. | sl. s. | 0.13 $CHCl_3$,$^{123}$ bz.; 0.289$^{15}$ ac. a. |
| 2998 | **——, ——,** (γ) | benzene γ-hexachloride | $C_6H_6Cl_6$ | 290.85 | need. f. al. | | 112–3 | | i. | | |
| 2999 | **——, ——,** (δ) | benzene δ-hexachloride | $C_6H_6Cl_6$ | 290.85 | pl. | | 129–32 | | | | |
| 3000 | **——, isopropyl-** | hexahydrocumene; normenthane | $C_3H_7C_6H_{11}$ | 126.24 | col. liq | $0.7902\frac{20}{4}$ | | 154.7 | i. | v. s. | v. s. eth. |
| 3001 | **——, 4-isopropyl-1-methyl-.** See *p-Menthane.* | | | | | | | | | | |
| 3002 | **——, methyl-** | hexahydrotoluene; cyclohexylmethane | $CH_3C_6H_{11}$ | 98.18 | col. liq., 1.4235 | $0.7864\frac{0}{4}$; $0.769\frac{20}{4}$ | −126.4 | 100.3 | i. | s. | s. eth. |
| 3003 | **——, phenyl-** | cyclohexylbenzene; 1,2,3,4,5,6-hexahydrobiphenyl | $C_6H_5C_6H_{11}$ | 160.25 | oil | $0.9440\frac{20}{4}$ | 7 | 237.5 | i. | v. s. | v. s. eth. |
| 3004 | **——, 1,3,5-trimethyl-** | hexahydromesitylene | $C_6H_9(CH_3)_3$ | 126.24 | (*cis*) col. liq., $1.4301^{20}_{He}$ | $0.773^{20}$ | | 140–140.5$^{752}$ | | | |
| | | | | | (*trans*) $1.4274^{20}_{He}$ | $0.7720^{20}$ | | 138.5–139$^{754}$ | | | |
| 3005 | **Cyclohexanecarboxylic acid*** | hexahydrobenzoic acid | $C_6H_{11}COOH$ | 128.17 | col. monocl. pr., $1.4561^{33.8}$ | $1.048\frac{16}{4}$ | 31 | 233 | $0.201^{15}$ | v. s. | v. s. eth. |
| 3006 | **——, 2-hydroxy-** | hexahydrosalicylic acid | $HOC_6H_{10}COOH$ | 144.17 | cr. f. w. | | 111 | | v. s. | v. s. | v. s. eth.; sl. s. bz. |
| 3007 | **——, 1,2,4,5-tetrahydroxy-*.** See *Quinic acid.* | | | | | | | | | | |
| 3008 | **1,2-Cyclohexanedicarboxylic acid*** | hexahydrophthalic acid | $C_6H_{10}(COOH)_2$ | 172.18 | (*cis*) tricl. pr. f. w. | | 192; d. $-H_2O$ >192 | | 0.2 | s. | s. acet. |
| | | | | | (*trans*) monocl. leaf. f. w. | | 221 | | | | |
| 3009 | **1,4-Cyclohexanedicarboxylic acid*** | hexahydroterephthalic acid | $C_6H_{10}(COOH)_2$ | 172.18 | (*cis*) leaflets f. w. | | 168–9 | | v. s. h. | s. | s. eth., $CHCl_3$ |
| | | | | | (*trans*) pr. f. w. | | 300 subl. | | 1.34 h. | v. s. | sl. s. eth.; s. acet.; i. $CHCl_3$ |

*Name approved by the International Union of Chemistry.

For explanations and abbreviations see beginning of table.

| No. | Name | Synonyms | Formula | Mol. Wt. |
|---|---|---|---|---|
| 2658 | **Chavicol** | *p*-allylphenol | $CH_2{:}CHCH_2C_6H_4{\cdot}OH$ | 134.17 |
| 2659 | **——, methyl ether.** | See *Estragole.* | | |
| 2660 | **Chelerythrine,** alcoholate | | $C_{21}H_{19}NO_5{\cdot}C_2H_6O$ | 411.44 |
| 2661 | **Chelidonine,** hydrochloride | | $C_{20}H_{19}NO_5{\cdot}HCl$ | 389.83 |
| 2662 | ***d*-Chelidonine** | | $C_{20}H_{19}NO_5{\cdot}H_2O$ | 371.38 |
| 2663 | **Chick antidermatitis factor.** | See *Pantothenic acid.* | | |
| 2664 | **Chinalgen.** | See *Analgen.* | | |
| 2664M | **Chitosamine.** | See D-*Glucosamine.* | | |
| 2665 | **Chloral** | trichloroethanal*; trichloroacetaldehyde | $CCl_3CHO$ | 147.40 |
| 2666 | ——, alcoholate | 2,2,2-trichloro-1-ethoxyethanol*; chloral hydrate monoethyl acetal | $CCl_3CH(OH)OC_2H_5$ | 193.47 |
| 2667 | ——, diethyl acetal. | See *Ethane, 1,1,1-trichloro-2,2-diethoxy-*. | | |
| 2668 | ——, hydrate | 2,2,2-trichloro-1,1-ethanediol*; trichloroethylidene glycol | $CCl_3CH(OH)_2$ | 165.42 |
| 2669 | **Chloral-antipyrine.** | See *Hypnal.* | | |
| 2670 | **Chloranil** | tetrachloroquinone; tetrachloro-*p*-benzoquinone | $C_6Cl_4O_2$ | 245.89 |
| 2671 | **Chloranilic acid** | 2,5-dichloro-3,6-dihydroxyquinone | $C_6Cl_2(OH)_2O_2$ | 208.99 |
| 2672 | **Chlorbutanol.** | See *Chloretone.* | | |
| 2673 | **Chlorbutol.** | See *Chloretone.* | | |
| 2674 | **Chloretone** | 1,1,1-trichloro-2-methyl-2-propanol*; trichloro-*tert*-butyl alcohol; acetone-chloroform; chlorbutol; chlorbutanol | $(CH_3)_2C(OH)CCl_3$ | 177.47 |
| 2675 | **Chlorhydrin.** | See 1,2-*Propanediol, 3-chloro-**. | | |
| 2676 | **Chlorine cyanide.** | See *Cyanogen chloride.* | | |
| | **Chloro-.** | See the parent compounds (e.g., for chloroacetic acid see | | |
| 2677 | **Chloroacetal** | 2-chloro-1,1-diethoxyethane*; chloroacetaldehyde diethyl acetal | $CH_2ClCH(OC_2H_5)_2$ | 152.62 |
| 2678 | **Chloroacetol.** | See *Propane, 2,2-dichloro-**. | | |
| 2679 | **Chloroform** | trichloromethane* | $CHCl_3$ | 119.39 |
| 2680 | **——, methyl-.** | See *Ethane, 1,1,1-trichloro-**. | | |
| 2681 | **——, nitro-.** | See *Chloropicrin.* | | |
| 2682 | **——, phenyl-.** | See *Toluene, α-trichloro-.* | | |
| 2683 | **Chlorogenine.** | See *Alstonine.* | | |
| 2684 | **α-Chlorohydrin.** | See 1,2-*Propanediol, 3-chloro-**. | | |
| 2685 | **Chlorophyll a** | | $C_{55}H_{72}MgN_4O_5 \cdot \frac{1}{2}H_2O$ | 902.49 |
| 2686 | **Chlorophyll b** | | $C_{55}H_{70}MgN_4O_6$ | 907.47 |
| 2687 | **Chloropicrin** | trichloronitromethane*; nitrochloroform | $CCl_3NO_2$ | 164.39 |

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| No. | Crystalline form, color and index of refraction | Density g/ml | Melting point, °C | Boiling point, °C | Solubility in grams per 100 ml of | | |
|---|---|---|---|---|---|---|---|
| | | | | | Water | Alcohol | Ether, etc. |
| 2658 | liq., $1.5441^{18}$ | $1.033\frac{18}{4}$ | <−25 | 237 | s. | ∞ | ∞ eth., chl. |
| 2659 | | | | | | | |
| 2660 | rhbdr. leaf.; sol. bl. fluores. | ..... | 207 | ..... | sl. s. | sl. s. | v. s. eth.; s. chl., amyl al., bz. |
| 2661 | wh. fine cr | ..... | ..... | ..... | $0.31^{18}$ | sl. s. | ..... |
| 2662 | monocl. tab. | ..... | 135–6 | ..... | i. | v. s. | v. s. eth.; s. chl., amyl al. |
| 2663 | | | | | | | |
| 2664 | | | | | | | |
| 2664M | | | | | | | |
| 2665 | col. liq., 1.45572 | $1.512\frac{20}{4}$ | −57.5 | 98 | s. | ∞ | ∞ eth.; s. chl. |
| 2666 | col. need. | $1.143\frac{40}{4}$ | 44–7 (55) | 115 | v. s. | s. | s. eth. |
| 2667 | | | | | | | |
| 2668 | col. monocl. tab., 1.538, 1.600, 1.602 | $1.9081\frac{20}{4}$ | 51.7 (61–3) | $96.3^{764}$ (98 d.) | $470^{17}$ | $77^{25}$ | 66.7 eth., s. chl. |
| 2669 | | | | | | | |
| 2670 | yel. monocl. pr. f. bz. | ..... | 290 (in sealed tube) | subl. | i. | s. h. | s. eth., bz.; sl. s. chl., $CS_2$ |
| 2671 | red leaf | ..... | 283–4 | ..... | v. sl. s. | ..... | ..... |
| 2672 | | | | | | | |
| 2673 | | | | | | | |
| 2674 | wh. cr. (+1 $H_2O$) f. w. | ..... | +1 $H_2O$ 80–1 (anh. 97) | 167 | i. c. | v. s. | v. s. eth.; 125 glyc.; s. chl., acet., bz., glac. ac. a. |
| 2675 | | | | | | | |
| 2676 | *Acetic acid, chloro-*). | | | | | | |
| 2677 | liq | $1.026\frac{18}{4}$ | ..... | $156.8^{(62-4^{39})}$ | sl. s. | ∞ | ∞ eth. |
| 2678 | | | | | | | |
| 2679 | col. liq., $1.4464^{18}$ | $1.49845\frac{18}{4}$ | −63.5 | 61.26 (58–61.5) | $1.0^{15}$ | ∞; const. boil. mixt. 7% et. al. | ∞ eth.; s. bz., acet., $CS_2$ |
| 2680 | | | | | | | |
| 2681 | | | | | | | |
| 2682 | | | | | | | |
| 2683 | | | | | | | |
| 2684 | | | | | | | |
| 2685 | hex. lancet shaped pl. | ..... | 150–3 | d. | i. | v. s. | v. s. eth.; s. pet. eth. |
| 2686 | pl | ..... | 183–5 | ..... | i. | v. s. | v. s. eth.; s. me. al. |
| 2687 | col. liq., $1.4607^{22}$ | $1.651\frac{20}{4}$; $1.69225\frac{0}{4}$ | −64, frs. −69 | 112 | i. | ∞ | ∞ eth. |

For explanations and abbreviations see beginning of table.

| No. | Name | Synonyms | Formula | Mol. Wt. | Crystalline form, color and index of refraction | Density g/ml | Melting point, °C | Boiling point, °C | Solubility in grams per 100 g. Water | Alcohol | Ether, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3549 | **Ethane, 1,1,2,2-tetrachloro-*** | *sym*-tetrachloroethane; acetylene tetrachloride | $CHCl_2CHCl_2$ | 167.86 | col. liq., 1.4942 | $1.600^{20}_{4}$ | −43.8 (−36) | 146.3 | i. | ∞ | ∞ eth. |
| 3549K | **——, 1,1,1,2-tetrachloro-2,2-difluoro-*** | | $CCl_3CClF_2$ | 203.85 | col. sld. | | 40.6 | 91.5 | i. | s. | s. eth. |
| 3549P | **——, 1,1,2,2-tetrachloro-1,2-difluoro-*** | | $CCl_2FCCl_2F$ | 203.85 | col. liq., 1.4129[25] | 1.64470[25] | 24.65 | 92.8 | i. | s. | s. eth. |
| 3550 | **——, 1,1,1,2-tetraphenyl-** | *uns*-tetraphenylethane; triphenylbenzylmethane; α-benzyltritan | $(C_6H_5)_3CCH_2C_6H_5$ | 334.44 | col. monocl. f. eth. | | 144 | 277–80[21] | i. | sl. s. | sl. s. eth. |
| 3551 | **——, 1,1,2,2-tetraphenyl-** | *sym*-tetraphenylethane | $(C_6H_5)_2CHCH(C_6H_5)_2$ | 334.44 | col. rhomb. need. f. chl. | $1.182^{20}_{4}$ | 211 (209) | 383 | | 0.76[18] | 14 bz.; s. ac. a. |
| 3552 | **——, 1,1,2-tribromo-*** | vinyl tribromide | $CH_2BrCHBr_2$ | 266.79 | liq., 1.58902 | $2.579^{20}_{4}$ | −26 | 188.4 | | s. | |
| 3553 | **——, 1,1,1-trichloro-*** | methylchloroform | $CH_3CCl_3$ | 133.42 | col. liq., 1.4376[21.6] | $1.3249^{26}_{4}$ | | 74.1 | i. | ∞ | ∞ eth. |
| 3554 | **——, 1,1,1-trichloro-2,2-diethoxy-*** | chloral diethyl acetal; trichloroacetal | $CCl_3CH(OC_2H_5)_2$ | 221.52 | liq | $1.266^{15}_{4}$ | | 197 | 0.5 | ∞ | ∞ eth., glyc. |
| 3555 | **——, 1,1,2-trichloro-*** | vinyl trichloride | $CH_2ClCHCl_2$ | 133.42 | col. liq., 1.4711 | $1.443^{20}_{4}$ | −36.7 | 113.5 | i. | ∞ | ∞ eth. |
| 3555R | **——, 1,1,1-trichloro-2,2,2-trifluoro-*** | | $CCl_3CF_3$ | 187.39 | col. gas | 1.5702 | 13.2 | 45.8 | i. | s. | s. eth. |
| 3556 | **——, 1,1,2-trichloro-1,2,2-trifluoro-** | | $C_2Cl_3F_3$ | 187.39 | col. liq., 1.3557[25] | 1.56354[25] | −36.4 | 47.7 | i. | s. | s. eth.; ∞ bz. |
| 3557 | **——, 1,1,1-triethoxy-*** | See *Orthoacetic acid, triethyl ester.* | | | | | | | | | |
| 3557M | **——, 1,1,1-trifluoro-*** | methylfluoroform | $CH_3CF_3$ | 84.04 | col. gas | 3.784 g/l | −107 | −46.8 | | | |
| 3558 | **——, 1,1,1-triiodo-*** | methyliodoform | $CH_3Cl_3$ | 407.80 | yel. octahdr. | | 95 d. | | | sl. s. | v. s. eth., $CS_2$, bz.; sl. s. lgr. |
| 3559 | **——, 1,1,1-triphenyl-** | α-methyltritan | $(C_6H_5)_3CCH_3$ | 258.35 | need. f. al. or eth. | | 95 | | i. | sl. s. c., s. h. | v. s. eth. |
| 3560 | **——, 1,1,2-triphenyl-** | | $(C_6H_5)_2CHCH_2C_6H_5$ | 258.35 | monocl. leaf. f. dil. al. | | 54–4.5 | 348–9[731] | i. | v. s. | v. s. eth. |
| 3561 | **Ethaneazobenzene.** | See *Benzeneazoethane.* | | | | | | | | | |
| 3561M | **Ethaneboronic acid.** | See *Boric acid, ethyl-.* | | | | | | | | | |
| 3562 | **Ethanedial*.** | See *Glyoxal.* | | | | | | | | | |
| 3563 | **Ethanediamide*.** | See *Oxamide.* | | | | | | | | | |
| 3564 | **1,2-Ethanediamine*.** | See *Ethylenediamine.* | | | | | | | | | |
| 3565 | **1,1-Ethanedicarboxylic acid, 1-hydroxy-2-phenyl-.** | See *Tartronic acid, benzyl-.* | | | | | | | | | |
| 3566 | **Ethanedinitrile*.** | See *Cyanogen.* | | | | | | | | | |
| 3567 | **Ethanedioic acid*.** | See *Oxalic acid.* | | | | | | | | | |
| 3568 | **1,1-Ethanediol, 2,2,2-tribromo-*.** | See *Bromal, hydrate.* | | | | | | | | | |
| 3569 | **——, 2,2,2-trichloro-*.** | See *Chloral, hydrate.* | | | | | | | | | |
| 3570 | **1,2-Ethanediol*.** | See *Glycol.* | | | | | | | | | |
| 3571 | **——, 1,2-dicyclohexyl-** | dodecahydrohydrobenzoin; cyclohexanone pinacol | $C_{12}H_{22}O_2$ | 198.30 | need | | 129–30 | | | | v. s. bz.; s. pet eth. |
| 3572 | **——, 1,2-diphenyl-.** | See *Hydrobenzoin; Isohydrobenzoin.* | | | | | | | | | |
| 3573 | **——, 1,1,2,2-tetraphenyl-*.** | See *Benzopinacol.* | | | | | | | | | |
| 3574 | **Ethanedioyl chloride*.** | See *Oxalyl chloride.* | | | | | | | | | |
| 3575 | **1,2-Ethanedisulfonic acid*** | ethylenedisulfonic acid | $C_2H_4(SO_3H)_2$ | 190.19 | cr. f. ac. a. | | 104 | | v. s. | v. s. | |
| 3576 | **1,2-Ethanedithiol*** | dithioglycol; ethylene mercaptan; ethylene dimercaptan | $HSCH_2CH_2SH$ | 94.19 | liq | 1.123 | | 146 | | s. | v. s. alk.; s. $NH_4OH$ |
| 3577 | **Ethanenitrile*.** | See *Acetonitrile.* | | | | | | | | | |
| 3578 | **——, 2-oxo-2-phenyl-.** | See *Benzoyl cyanide.* | | | | | | | | | |
| 3579 | **Ethanesulfinic acid*** | ethylsulfinic acid | $C_2H_5SO_2H$ | 94.13 | syrup | | | | | | s. alk. |
| 3580 | **Ethanesulfonic acid*** | ethylsulfonic acid | $C_2H_5SO_2OH$ | 110.13 | hyg. cr. | | | | s., deliq. | s. | s. alk. |
| 3581 | **——, 2-amino-.** | See *Taurine.* | | | | | | | | | |
| 3582 | **——, 2-hydroxy-.** | See *Isethionic acid.* | | | | | | | | | |

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For explanations and abbreviations see beginning of table.

| No. | Name | Synonyms | Formula | Mol. Wt. |
|---|---|---|---|---|
| 3801 | **Ethyl arsenate** | triethyl arsenate; ethyl orthoarsenate | $(C_2H_5)_3AsO_4$ | 226.09 |
| 3802 | **Ethyl arsenite** | triethyl arsenite; ethyl orthoarsenite | $(C_2H_5)_3AsO_3$ | 210.09 |
| 3803 | **Ethyl borate** | triethyl borate; triethoxyboron | $B(OC_2H_5)_3$ | 146.00 |
| 3804 | **Ethyl bromide** | bromoethane* | $CH_3CH_2Br$ | 108.98 |
| 3805 | ——, **vinyl-**. | See 1-*Butene, 4-bromo-**. | | |
| 3805M | **Ethylcellulose.** | See *Cellulose, ethyl ether.* | | |
| 3806 | **Ethyl chloride** | chloroethane* | $CH_3CH_2Cl$ | 64.52 |
| 3807 | **Ethyl cyanide.** | See *Propionitrile.* | | |
| 3808 | **Ethyl disulfide** | ethyldithioethane*; diethyl disulfide | $(C_2H_5)_2S_2$ | 122.24 |
| 3809 | **Ethylene** | ethene*; elayl | $CH_2{:}CH_2$ | 28.05 |
| 3810 | ——, esters. | See "diacetate", "dibenzoate", etc. under *Glycol.* | | |
| 3811 | ——, **bromo-**. | See *Vinyl bromide.* | | |
| 3812 | ——, **1-bromo-2-phenyl-**. | See *Styrene, β-bromo-.* | | |
| 3813 | ——, **butyl-**. | See 1-*Hexene**. | | |
| 3814 | ——, **sec-butyl-**. | See 1-*Pentene, 3-methyl-**. | | |
| 3815 | ——, ***tert*-butyl-**. | See 1-*Butene, 3,3-dimethyl-**. | | |
| 3816 | ——, **1-butyl-1-methyl-**. | See 1-*Hexene, 2-methyl-**. | | |
| 3817 | ——, **1-butyl-2-methyl-**. | See 2-*Heptene**. | | |
| 3818 | ——, **1-sec-butyl-1-methyl-**. | See 1-*Pentene, 2,3-dimethyl-**. | | |
| 3819 | ——, **1-sec-butyl-2-methyl-**. | See 2-*Hexene, 4-methyl-**. | | |
| 3820 | ——, **chloro-**. | See *Vinyl chloride.* | | |
| 3821 | ——, **1,2-dibromo-** | acetylene dibromide; *sym*-dibromoethylene | $CHBr{:}CHBr$ | 185.87 |
| 3822 | ——, **1,1-dichloro-** | *uns*-dichloroethylene | $CH_2{:}CCl_2$ | 96.95 |
| 3823 | ——, **1,2 (or *sym*)-dichloro-(*cis*)** | acetylene dichloride | $CHCl{:}CHCl$ | 96.95 |
| 3823A | ——, **1,2 (or *sym*)-dichloro-(*trans*)** | acetylene dichloride | $CHCl{:}CHCl$ | 96.95 |
| 3824 | **Ethylene, 1, 1 (or *uns*)-diethyl-**. | See 1-*Butene, 2-ethyl-**. | | |
| 3825 | ——, **1,2(or *sym*)-diethyl-**. | See 3-*Hexene**. | | |
| 3826 | ——, **1,1-diethyl-2-methyl-**. | See 2-*Pentene, 3-ethyl-**. | | |
| 3826M | ——, **1,1-difluoro-** | *uns*-difluoroethylene | $CH_2{:}CF_2$ | 64.04 |
| 3827 | ——, **1,2(or *sym*)-diisopropyl-**. | See 3-*Hexene, 2,5-dimethyl-**. | | |
| 3828 | ——, **1,1(or *uns*)-dimethyl-**. | See *Propene, 2-methyl-**. | | |
| 3829 | ——, **1,2(or *sym*)-dimethyl-**. | See 2-*Butene**. | | |
| 3830 | ——, **1,1-dimethyl-2-propyl-**. | See 2-*Hexene, 2-methyl-**. | | |
| 3831 | ——, **1,2-dimethyl-1-propyl-**. | See 2-*Hexene, 3-methyl-**. | | |
| 3832 | ——, **1,1-diphenyl-** | *uns*-diphenylethylene | $(C_6H_5)_2C{:}CH_2$ | 180.24 |
| 3833 | ——, ***trans*-1,2-diphenyl-**. | See *Stilbene.* | | |
| 3834 | ——, **ethyl-**. | See 1-*Butene**. | | |
| 3835 | ——, **1-ethyl-1,2-dimethyl-**. | See 2-*Pentene, 3-methyl-**. | | |
| 3836 | ——, **2-ethyl-1,1-dimethyl-**. | See 2-*Pentene, 2-methyl-**. | | |
| 3837 | ——, **1-ethyl-1-isobutyl-**. | See 1-*Butene, 2-ethyl-3-methyl-**. | | |
| 3838 | ——, **1-ethyl-2-isopropyl-**. | See 3-*Hexene, 2-methyl-**. | | |
| 3839 | ——, **1-ethyl-1-methyl-**. | See 1-*Butene, 2-methyl-**. | | |
| 3840 | ——, **1-ethyl-2-methyl-**. | See 2-*Pentene**. | | |
| 3841 | ——, **1-ethyl-1-propyl-**. | See 1-*Pentene, 2-ethyl-**. | | |
| 3842 | ——, **1-ethyl-2-propyl-**. | See 3-*Heptene**. | | |
| 3843 | ——, **ethyltrimethyl-**. | See 2-*Pentene, 2,3-dimethyl-**. | | |
| 3843M | ——, **fluoro-**. | See *Vinyl fluoride.* | | |
| 3844 | ——, **iodo-**. | See *Vinyl iodide.* | | |

*Name approved by the International Union of Chemistry.



| No. | Crystalline form, color and index of refraction | Density g/ml | Melting point, °C | Boiling point, °C | Solubility in grams per 100 ml of | | |
|---|---|---|---|---|---|---|---|
| | | | | | Water | Alcohol | Ether, etc. |
| 3801 | ..... | $1.3264^{0}_{4}$ | ..... | 238 | d. c. | ..... | ..... |
| 3802 | ..... | $1.224^{0}_{4}$ | ..... | 166 | d. c. | ..... | ..... |
| 3803 | col. liq., 1.381 | $0.864^{25.5}$ | ..... | 120 | d. | ∞ | ∞ eth. |
| 3804 | col. liq., 1.42386 | $1.430^{20}_{4}$; $1.4505^{25}_{4}$ | −119 | 38.0 | $1.08^{0}$; $0.96^{17.5}$; $0.91^{20}$ | ∞ | ∞ eth., chl. |
| 3805 | | | | | | | |
| 3805M | | | | | | | |
| 3806 | col. liq. or gas. | $0.9214^{0}_{4}$ | −138.7 | 12.2 | $0.574^{20}$ | $48.3^{21}$ | ∞ eth. |
| 3807 | | | | | | | |
| 3808 | oil, $1.50633^{20}$ | $0.99267^{20}_{4}$ | ..... | 153–4 | v. sl. s. | ∞ | ∞ eth. |
| 3809 | col. gas, $1.363^{-100}$ | 1.2604 g/l; $0.566^{-102}_{4}$ | −169.4; frs. −181 | −103.9 | $25.6^{0}$ $cm^3$ | 360 $cm^3$ | s. eth. |
| 3810 | | | | | | | |
| 3811 | | | | | | | |
| 3812 | | | | | | | |
| 3813 | | | | | | | |
| 3814 | | | | | | | |
| 3815 | | | | | | | |
| 3816 | | | | | | | |
| 3817 | | | | | | | |
| 3818 | | | | | | | |
| 3819 | | | | | | | |
| 3820 | | | | | | | |
| 3821 | col. liq., 1.5428 | $2.271^{17.5}_{4}$ | (*cis*)−53; (*trans*)−6.5 | $110^{754}$ 108 | i. | v. s. | v. s. eth. |
| 3822 | liq. | $1.250^{15}_{4}$ | ..... | 31.7 | i. | ..... | ..... |
| 3823 | liq., $1.4519^{15}$ | $1.291^{15}_{4}$ | −80.5 | 60.1 | i. | ∞ | ∞ eth. |
| 3823A | liq., $1.4490^{15}$ | $1.265^{15}_{4}$ | −50 | 48.4 | i. | ∞ | ∞ eth. |
| 3824 | | | | | | | |
| 3825 | | | | | | | |
| 3826 | | | | <−70 | i. | s. | s. eth. |
| 3826M | col. gas | ..... | ..... | | | | |
| 3827 | | | | | | | |
| 3828 | | | | | | | |
| 3829 | | | | | | | |
| 3830 | | | | | | | |
| 3831 | | | | | | | |
| 3832 | col. liq., $1.610^{14}$ | $1.038^{14}_{4}$; $1.0206^{22}_{4}$ | 9 | 277 | ..... | ..... | ..... |
| 3833 | | | | | | | |
| 3834 | | | | | | | |
| 3835 | | | | | | | |
| 3836 | | | | | | | |
| 3837 | | | | | | | |
| 3838 | | | | | | | |
| 3839 | | | | | | | |
| 3840 | | | | | | | |
| 3841 | | | | | | | |
| 3842 | | | | | | | |
| 3843 | | | | | | | |
| 3843M | | | | | | | |
| 3844 | | | | | | | |

For explanations and abbreviations see beginning of table.

| No. | Name | Synonyms | Formula | Mol. Wt. |
|---|---|---|---|---|
| 8317 | **Tin difluoride, diethyl-*** | ..... | $(C_2H_5)_2SnF_2$..... | 214.82 |
| 8318 | **Tin oxide, diethyl-***... | diethylstannone..... | $(C_2H_5)_2SnO$..... | 192.82 |
| 8319 | **Tin trichloride, methyl-*** | ..... | $CH_3SnCl_3$..... | 240.11 |
| 8320 | **T.N.A.** | See *Aniline, 2,4,6-trinitro-*. | | |
| 8321 | **T.N.T.** | See *Toluene, 2,4,6-trinitro-*. | | |
| 8322 | **Tobias' acid.** | See *2-Naphthylamine-1-sulfonic acid.* | | |
| 8322M | **α-Tocopherol**..... | one factor of vitamin E..... | $C_{29}H_{50}O_2$..... | 430.70 |
| 8323 | **Tolan.** | See *Acetylene, diphenyl-*. | | |
| 8324 | **o-Tolidine**..... | 4,4'-bi-*o*-toluidine ($NH_2$=1); 4,4'-diamino-3,3'-dimethylbiphenyl | $[NH_2(CH_3)C_6H_3]_2$.. | 212.29 |
| 8325 | ***m*-Tolidine**..... | 4,4'-bi-*m*-toluidine ($NH_2$=1); 4,4'-diamino-2,2'-dimethylbiphenyl | $[NH_2(CH_3)C_6H_3]_2$.. | 212.29 |
| 8326 | ***p*-Tolidine**..... | ..... | $[NH_2(CH_3)C_6H_3]_2$.. | 212.29 |
| 8327 | **o-Tolualdehyde**..... | 2-methylbenzenecarbonal*; *o*-methylbenzaldehyde | $CH_3C_6H_4CHO$.... | 120.14 |
| 8328 | ***m*-Tolualdehyde**..... | *m*-methylbenzaldehyde..... | $CH_3C_6H_4CHO$.... | 120.14 |
| 8329 | ***p*-Tolualdehyde**..... | *p*-methylbenzaldehyde..... | $CH_3C_6H_4CHO$.... | 120.14 |
| 8330 | **α-Tolualdehyde**..... | phenylacetaldehyde..... | $C_6H_5CH_2CHO$.... | 120.14 |
| 8331 | ***o*-Toluamide**..... | *o*-methylbenzamide..... | $CH_3C_6H_4CONH_2$.. | 135.16 |
| 8332 | ***m*-Toluamide**..... | *m*-methylbenzamide..... | $CH_3C_6H_4CONH_2$.. | 135.16 |
| 8333 | ***p*-Toluamide**..... | *p*-methylbenzamide..... | $CH_3C_6H_4CONH_2$.. | 135.16 |
| 8334 | **α-Toluanilide**..... | α-phenylacetanilide..... | $C_6H_5CH_2CONHC_6H_5$ | 211.25 |
| 8335 | **Tolubenzyl alcohol.** | See *Carbinol, tolyl-*. | | |
| 8336 | **Toluene**..... | methylbenzene; phenylmethane | $C_6H_5CH_3$..... | 92.13 |
| 8337 | **——, α-amino-.** | See *Benzylamine*. | | |
| 8338 | **——, ω-azido-.** | See *Toluene, α-triazo-*. | | |
| 8339 | **——, benzyl-.** | See *Methane, phenyltolyl-*. | | |
| 8340 | **——, α-(benzyldithio)-.** | See *Benzyl disulfide.* | | |
| 8341 | **——, *o*-bromo-**..... | *o*-tolyl bromide..... | $CH_3C_6H_4Br$..... | 171.04 |
| 8342 | **——, *m*-bromo-**..... | *m*-tolyl bromide..... | $BrC_6H_4CH_3$..... | 171.04 |
| 8343 | **——, *p*-bromo-**..... | *p*-tolyl bromide..... | $BrC_6H_4CH_3$..... | 171.04 |
| 8344 | **——, α-bromo-.** | See *Benzyl bromide.* | | |
| 8345 | **——, α-bromo-*o*-nitro-** | *o*-nitrobenzyl bromide..... | $NO_2C_6H_4CH_2Br$... | 216.04 |
| 8346 | **——, α-bromo-*m*-nitro-** | *m*-nitrobenzyl bromide..... | $NO_2C_6H_4CH_2Br$... | 216.04 |
| 8347 | **——, α-bromo-*p*-nitro-** | *p*-nitrobenzyl bromide..... | $NO_2C_6H_4CH_2Br$... | 216.04 |
| 8348 | **——, butoxy-.** | See *Ether, butyl tolyl.* | | |
| 8349 | **——, *o*-butyl-**..... | 1-butyl-2-methylbenzene..... | $CH_3C_6H_4(CH_2)_3CH_3$ | 148.24 |

*Name approved by the International Union of Chemistry.





| No. | Crystalline form, color and index of refraction | Density g/ml | Melting point, °C | Boiling point, °C | Solubility in grams per 100 ml of | | |
|---|---|---|---|---|---|---|---|
| | | | | | Water | Alcohol | Ether, etc. |
| 8317 | sq. pl. or lng. rhomb. tab. f. me. al. | ..... | 229 | ..... | ..... | $0.45^{21}$ | $2.64^{21}$ me. al.; $0.047^{21}$ bz. |
| 8318 | wh. powd..... | ..... | infus. | ..... | i. | ..... | s. HCl, dil. a., conc. alk.; i. org. solv. |
| 8319 | col. cr..... | ..... | 43 | ..... | s. c. | ..... | s. org. solv.; hyd. by alk. |
| 8320 | | | | | | | |
| 8321 | | | | | | | |
| 8322 | | | | | | | |
| 8322M | pa. yel. oily liq. | ..... | ..... | d. 350 | i. | s. | s. eth. |
| 8323 | | | | | | | |
| 8324 | col. sc. f. h. w. | ..... | 126.5–9 | ..... | sl. s. | v. s. | v. s. eth. |
| 8325 | pr. f. h. w..... | ..... | 107–8 | ..... | s. h. | v. s. | v. s. eth. |
| 8326 | leaf..... | ..... | 103 | ..... | s. h. | v. s. | v. s. eth. |
| 8327 | liq., $1.5485^{19.0}$ | 1.039 | ..... | 195.5 | sl. s. | s. | s. eth. |
| 8328 | liq., $1.5406^{21.4}$ | 1.019 | ..... | 199(195.5) | sl. s. | ∞ | ∞ eth. |
| 8329 | liq., $1.5469^{16.6}$ | 1.020 | ..... | 204 | sl. s. | ∞ | ∞ eth. |
| 8330 | col. liq., $1.5254^{19.6}$ | 1.027 | <–10 | 194 | v. sl. s. | ∞ | ∞ eth. |
| 8331 | col. need. f. w. | ..... | 147 (139–40) | ..... | sl. s. c., v. s. h. | v. s. | v. s. eth. |
| 8332 | need. f. eth.... | ..... | 97 (94) | ..... | sl. s. | s. | sl. s. eth.; v. sl. s. bz. |
| 8333 | col. need. f. w. | ..... | 165 (159–60) | ..... | sl. s. c., v. s. h. | v. s. | v. s. eth. |
| 8334 | wh. pr. f. al.... | ..... | 117 | ..... | i. | 3.3 | 1.1 eth.; i. $H_2SO_4$, dil. KOH |
| 8335 | | | | | | | |
| 8336 | col. liq., $1.4969^{20}$ | $0.8669^{20}$ | –95 | 110.626 | $0.047^{16}$ | ∞ | ∞ eth.; s. chl., glac. ac. a., acet., $CS_2$, bz. |
| 8337 | | | | | | | |
| 8338 | | | | | | | |
| 8339 | | | | | | | |
| 8340 | | | | | | | |
| 8341 | col. liq..... | 1.422 | –27 (–26 to –29) | 181.75 | i. | v. s. | v. s. eth., bz. |
| 8342 | col. liq., 1.551 | $1.4099^{\frac{20}{4}}$ | –39.8 | 183.7 | i. | s. | ∞ eth. |
| 8343 | rhomb. cr. f. al., 1.5490 | $1.3898^{\frac{20}{4}}$ | 28 | 184–5 | i. | s. | s. eth., bz. |
| 8344 | | | | | | | |
| 8345 | cr. f. dil. al.... | ..... | 46–7 | ..... | i. | v. s. | s. bz. |
| 8346 | need..... | ..... | 58 | ..... | v. sl. s. | s. | ..... |
| 8347 | need. f. al..... | ..... | 100 (97–8) | ..... | sl. s. (i.) | $2^{19}$; $37^{75}$ | v. s. eth. |
| 8348 | | | | | | | |
| 8349 | oil..... | $0.8702^{\frac{18}{4}}$ | ..... | 200–1 | i. | sl. s. | s. eth. |

For explanations and abbreviations see beginning of table.

| No. | Name | Synonyms | Formula | Mol. Wt. | Crystalline form, color and index of refraction | Density g/ml | Melting point, °C | Boiling point, °C | Solubility in grams per 100 ml of Water | Alcohol | Ether, etc. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2583 | **Carbon monoxide** | | CO | 28.01 | col. odorl. pois. gas | liq. $0.814\frac{-195}{4.4}$; $1.250\frac{0}{4}$ g/l | −207 (−213) | −190 (−192) | $0.0044^{0}$ g, $0.0028^{20}$ g, $0.0010^{50}$ g, 3.5° $cm^3$ | $20^{20}$ $cm^3$ | s. bz., ac. a., $Cu_2Cl_2$ |
| 2584 | **Carbon oxysulfide.** | See *Carbonyl sulfide.* | | | | | | | | | |
| 2585 | **Carbon suboxide** | malonic anhydride (so-called); dioxopropadiene* | OC:C:CO | 68.03 | | | | | | | |
| 2586 | **Carbon tetrabromide** | tetrabromomethane* | $CBr_4$ | 331.67 | col. monocl. tab., $1.59998^{99.5}$ (He) | 3.42 | α48.4 β90.1 | 189.5 sl. d. | $0.024^{20}$ | s. | s. eth., chl. |
| 2587 | **Carbon tetrachloride** | tetrachloromethane* | $CCl_4$ | 153.84 | col. liq., $1.46305^{15}$ | $1.595\frac{20}{4}$; $1.63195\frac{0}{4}$ | −22.8; frz. to trimorph.; −28.6; −23.8; −21.2 | 76.8 | $0.03^{20}$ | ∞ | ∞ eth.,chl., bz; |
| 2587M | **Carbon tetrafluoride** | tetrafluoromethane* | $CF_4$ | 88.01 | col. gas | $1.96^{-184}$ | −184 | −128 | sl. s. | | |
| 2588 | **Carbon tetraiodide** | tetraiodomethane* | $CI_4$ | 519.69 | dk. red cub. | 4.32 | 171 d. | subl. 90–100 vac. | i., d. h. | s., d. h. | s. eth. |
| 2589 | **Carbonyl chloride.** | See *Phosgene.* | | | | | | | | | |
| 2589M | **Carbonyl fluoride** | fluoroformyl fluoride | $COF_2$ | 66.01 | col. gas | $1.139^{-114}$ | −114 | −83 | d. | d. | |
| 2590 | **Carbonyl sulfide** | carbon oxysulfide | COS | 60.07 | gas | liq. $1.24^{-87}$; (A) 2.105; 2.721 g/l | −138 | −50.2 (−47.5) | 100 $cm^3$ | $800^{22}$ $cm^3$ | $4.4^{15}$ $cm^3$ pyr.; $12^{15}$ $cm^3$ nitro bz.; $1500^{23}$ $cm^3$ tol. |
| 2591 | **Carbostyril** | 2-quinolinol or 2(1)-quinolone; *o*-aminocinnamic acid lactam | $C_9H_7NO$ | 145.15 | pr. f. al. | | 200 | subl. | v. sl. s. | v. s. | v. s. eth.; s. dil. HCl |
| 2592 | **——, 3-ethyl-** | | $C_6H_4NHCOC(C_2H_5)CH$ | 173.21 | col. cr. | | 168 | | | | |
| 2593 | **——, 4-methyl-** | 2(1)-lepidone | $C_{10}H_9NO$ | 159.18 | col. need. f. w. | | 217.4 | $270^{17}$ | v. sl. s. c. | v. s. h. | v. sl. s. eth.; sl. s. bz. |
| 2594 | **Carbothialdine** | | $C_8H_{10}N_2S_2$ | 162.27 | cr. | | | | i. | sl. s. | i. eth., s. a. |
| 2595 | **Carbylamine chloride, Carbylamine derivatives** | **phenyl-.** See *Aniline, N-(dichloromethylene)-.* See *Amyl isocyanide, Butyl isocyanide, etc.* | | | | | | | | | |
| 2596 | **Carminic acid** | | $C_{22}H_{20}O_{13}$ | 492.38 | red monocl. pr. | | 136 d. | | v. s. | s. | v. sl. s. eth.; s. conc. $H_2SO_4$, alk.; i. bz., chl. |
| 2597 | **Carnaubyl alcohol** | | $C_{24}H_{50}O$ | 354.65 | leaf | | 69 | | | | |
| 2599 | **α-Carotene** | α-carotene | $C_{40}H_{56}$ | 536.85 | $[\alpha]$ $+364^{23}_{Cd}$ in bz. | | 175 | | sl. s. | s. | |
| 2600 | **β-Carotene** | β-carotin; provitamin A | $C_{40}H_{56}$ | 536.85 | red-br. glist. cr. | | 181–2 | | i. | sl. s. | sl. s. eth., me. al., chl.; s. $CS_2$, bz., pet. eth. |
| 2601 | **Carotin.** | See *Carotene.* | | | | | | | | | |
| 2602 | **d-Carpaine** | | $C_{14}H_{23}NO_2$ | 239.35 | monocl. pr. f. al. $[\alpha]$ $+21°55'_D$ in al. | | 121 | | i. | 11 | 3 eth.; s. chl., bz., amyl al., $CS_2$ |
| 2603 | **——, hydrochloride** | | $C_{14}H_{23}NO_2 \cdot HCl$ | 275.82 | lng. wh. rhomb. or monocl. need. | | 225 d. | | 11.6 | s. | s. eth. |
| 2604 | **Carubinose.** | See *d-Mannose.* | | | | | | | | | |

*Name approved by the International Union of Chemistry.

For explanations and abbreviations see beginning of table.

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